City of Trinidad

Trinidad ASBS Stormwater Improvements

OPC Project Update July 26, 2017

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Presentation Outline

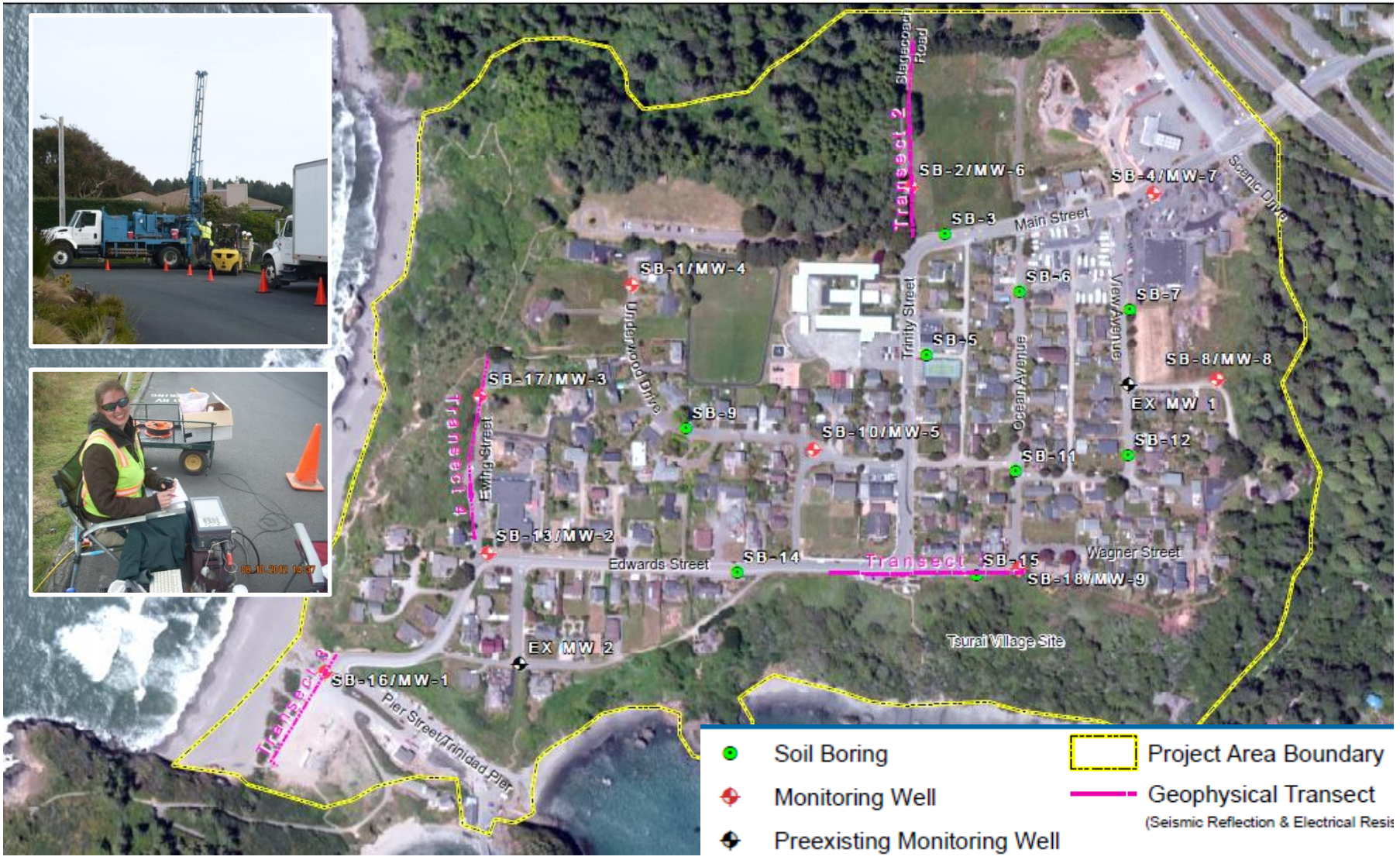
- ✓ ASBS Stormwater Improvement Summary
- ✓ Review of Initial Geophysical and Groundwater Model Work
- ✓ Summary of OPC Grant Construction Projects
- ✓ Review of Design Components
- ✓ Next Steps

ASBS Stormwater Project Summary

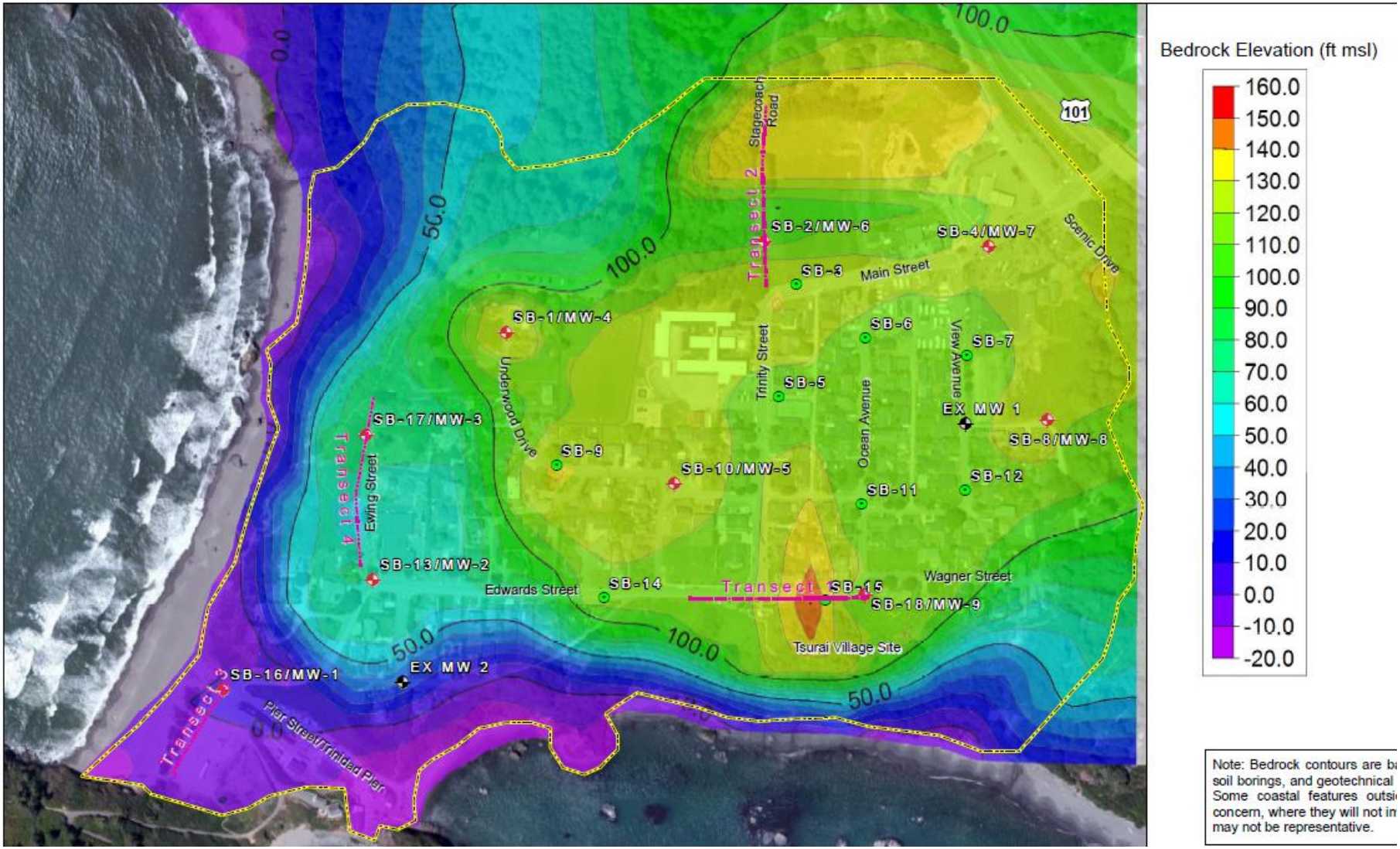
This Project was Identified in the Integrated Coastal Watershed Management Plan (ICWMP) – Stormwater Action Plan 2006-2008

1) Project addresses letter from State Board to the City regarding protection of ASBS which includes permitting requirements and monitoring of stormwater at the current Ocean Discharge .
2) Basic concept is to utilize simple technologies, gravity based systems, with low maintenance requirements.
3) Concept focuses on common BMPs, such as multiple types of infiltration.
4) Concept focuses on multiple smaller scale solutions over a wider area to reduce the quantity and improve the quality of the stormwater.
5) Concept allows for the eventual removal of the current Ocean Discharge which should allow the City to avoid ongoing compliance with the ASBS permitting requirements.

Geophysical Evaluation Overview

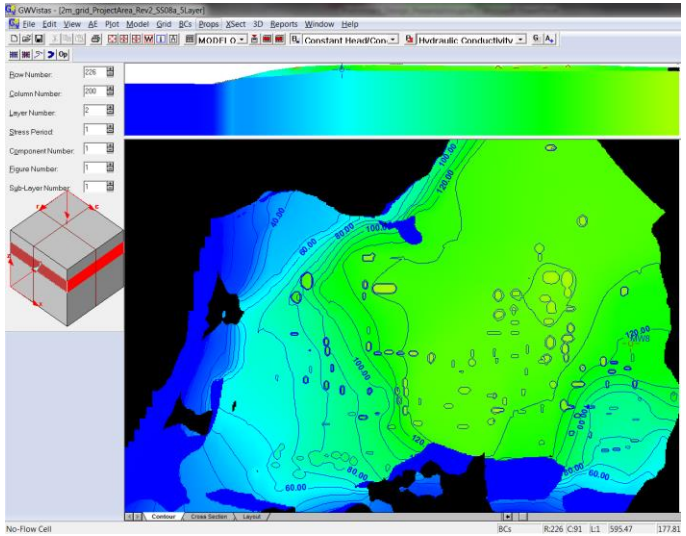


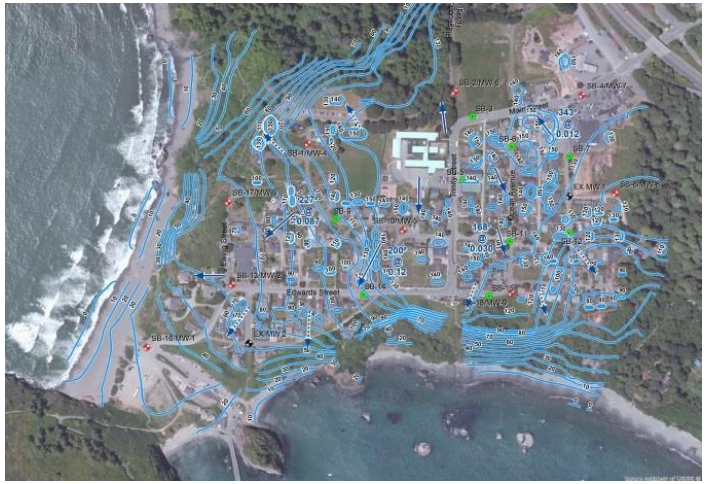
Geophysical and Groundwater Investigation



Groundwater Model

- MODFLOW-Surfact 3-D flow groundwater model was developed based upon physical properties collected during the geotechnical investigation
- Predictive groundwater model that describes groundwater movement and response to various changes in conditions – spatial and temporal
- Used to evaluate changes in subsurface conditions for stormwater design scenarios
- Model set up and calibration reviewed by independent 3rd party firm, HydroGeologic, Inc.
- Results analyzed by Independent Geotechnical Engineering Firm, Crawford & Associates, Inc.





Groundwater Evaluation Conclusions

Based on:

- Geotechnical evaluation
- Groundwater monitoring results

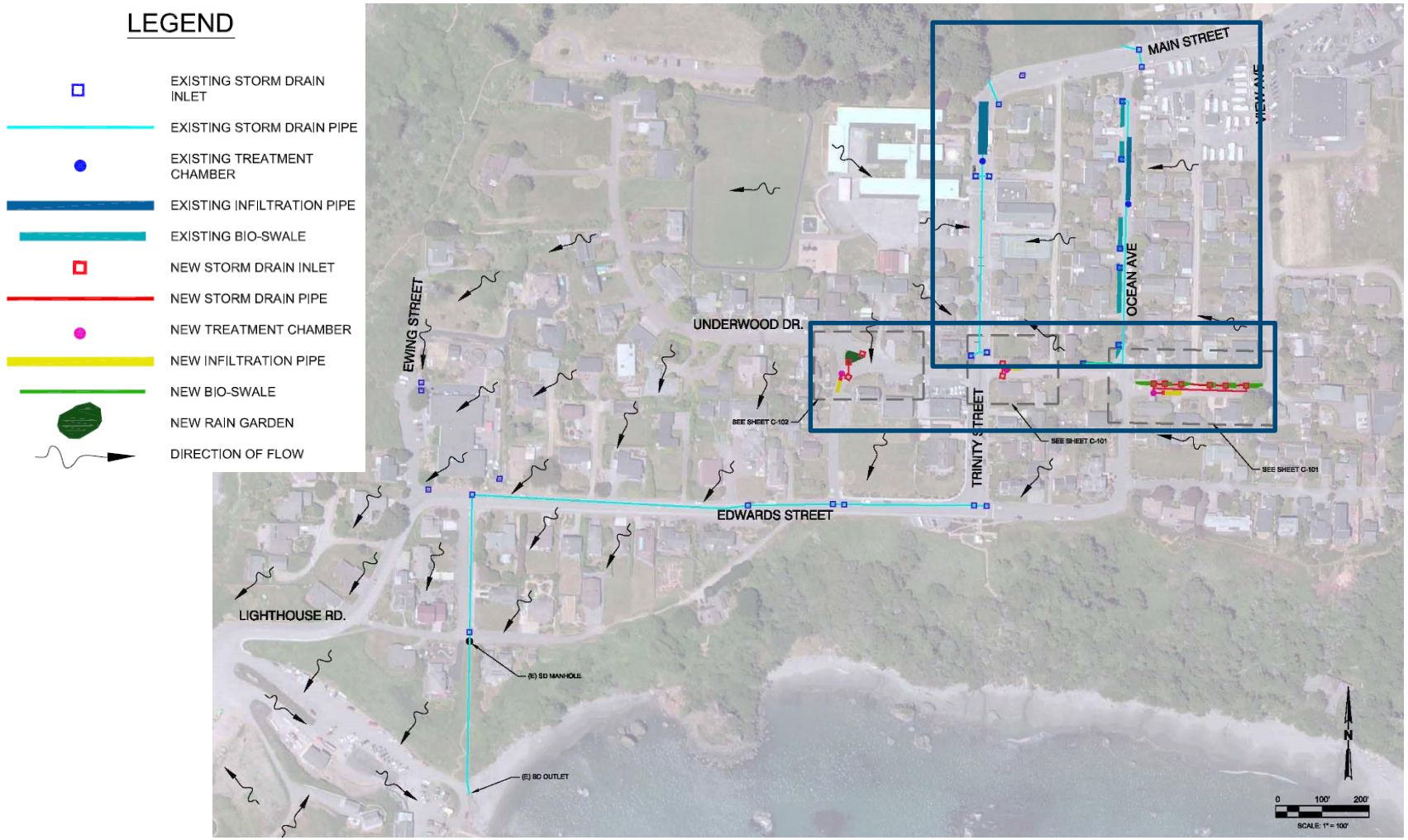
Groundwater flow patterns

- Water entering the system from the surface migrates vertically to confining layer/bedrock
- Groundwater lateral movement is largely governed by the shape and slope of the confining bedrock layer

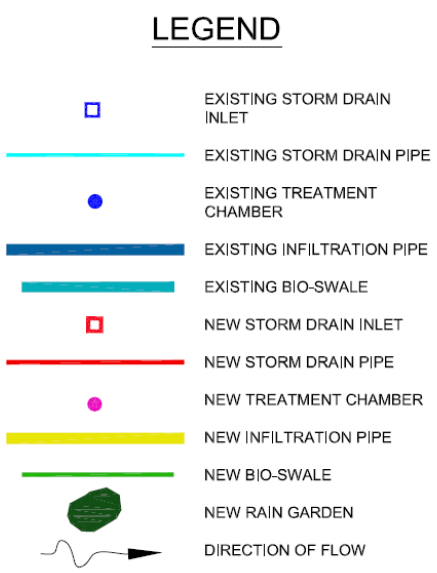
Used to determine:

- Where infiltration can occur while considering existing septic systems, bluff stability, creeks and seeps

Review of Past and Upcoming Project Work



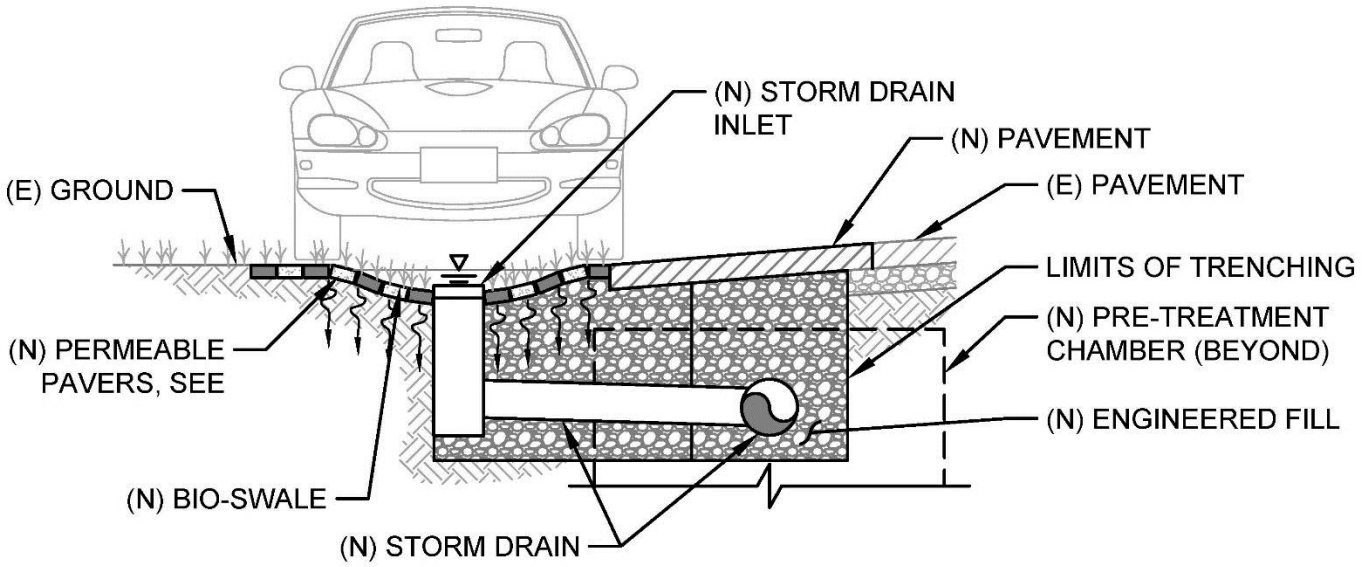
Review of East Street Project Work



Overview:

- Located on East Street between Ocean and View
- Bioswales on north side of street
- Treatment chamber and infiltration pipes in street

Design: Bio-Swales



Lessons Learned: Bio-Swales or Grassy Swales

Positive Feedback:

- Resolved drainage issues for some residents
- Like how they look
- Still allows parking along street

Negative Feedback:

- Took too long after construction to be able to use them and park
- They are too deep, prefer more flat
- Don't like how they look
- Have to walk through water when raining to get to vehicle
- They collect sediment
- They require maintenance

Installed Swale on Ocean

Revised Design: Bio-Swales or Grassy Swales

Changes Based on Feedback:

- Took too long after construction to be able to use them and park – Now will be able to park right after construction
- They are too deep, prefer more flat – Now more flat, less deep
- Don't like how they look – Now using different permeable paver product
- Have to walk through water when raining to get to vehicle – Now less ponding with better infiltration

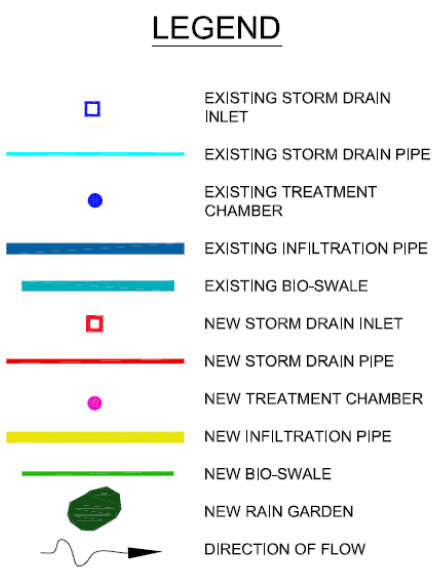
Unchanged items:

- Resolves drainage issues for some residents
- Allows parking along street
- Provides water quality treatment
- They require maintenance

Installed Swale on Ocean

New Turf Block Product

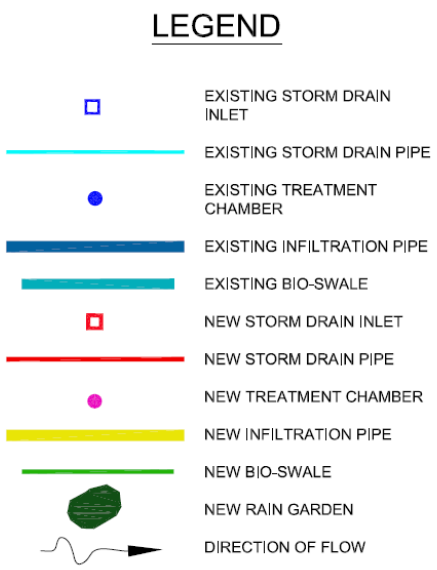
Review of West Street Project Work



Overview:

- Located on West Street between Trinity and Ocean
- No bioswales
- Drainage inlets, treatment chamber, and infiltration pipes in street

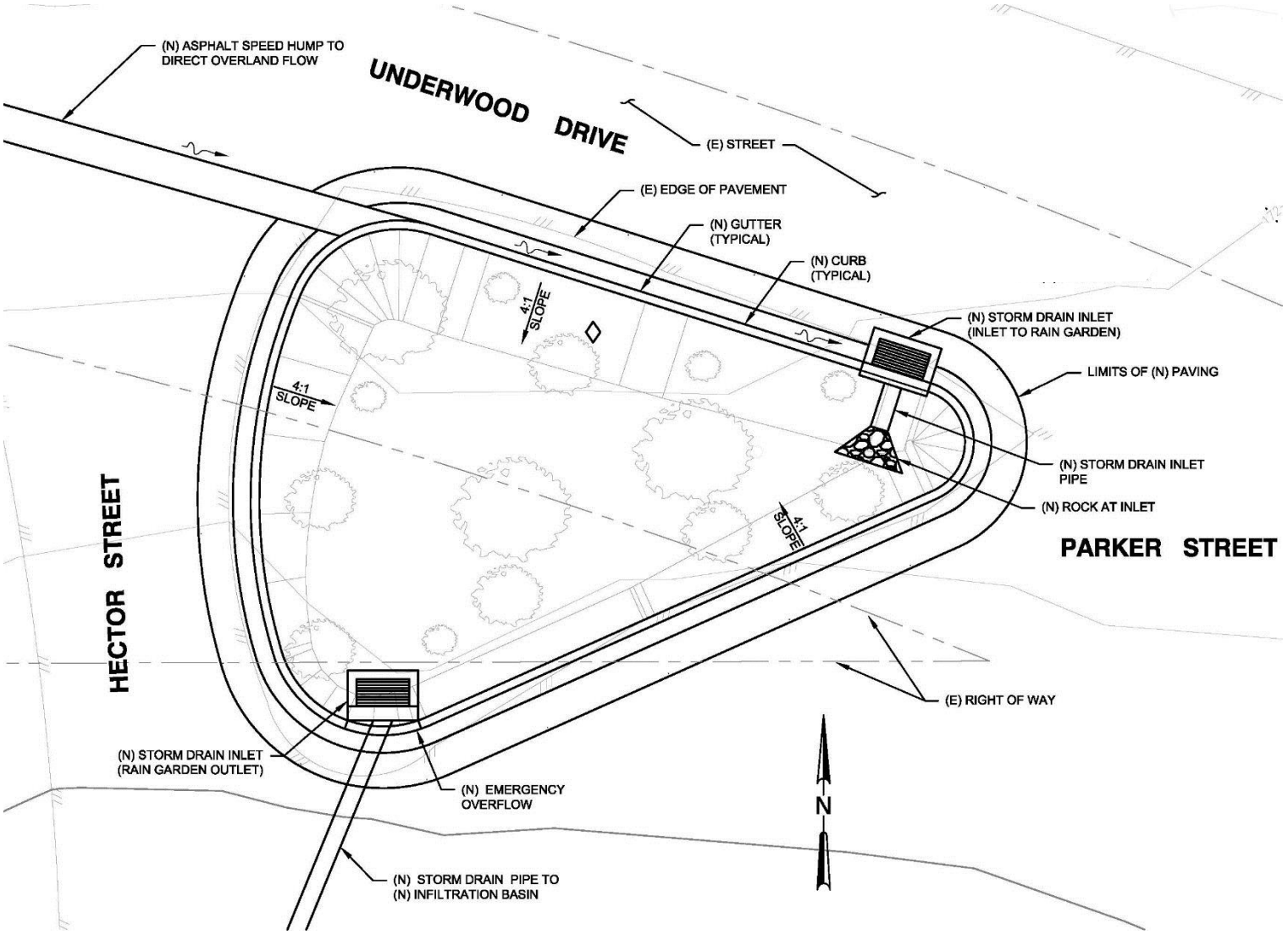
Review of Hector Street Project Work



Overview:

- Located on Hector Street and Underwood
- Rain garden with native plants
- Treatment chamber and infiltration pipes in street

Design: Rain Garden at Hector & Underwood



Rendering: Rain Garden at Hector & Underwood

BEFORE

AFTER- RENDERING

Next Steps

OPC Upper Watershed Stormwater Project

- Construction of Hector, East, and West Streets Scheduled for Fall 2017
- Construction likely September and October
- Smaller projects than those on Trinity and Ocean
- No street closures but one-way traffic during construction
- Smaller projects also not as deep, with no shoring and less noise than before

Lower Watershed Stormwater Project

- Prop 1 grant application for $4 million selected for funding
- City is working with State to finalize grant agreement
- Work would allow final stormwater components to be constructed
- Storm drain outfall on beach by boat ramp would be abandoned in place

Questions?

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